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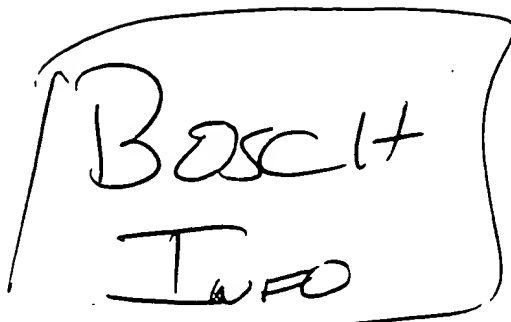
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0932335.002
TECH TRACK
FUEL INJECTION

PCT ISS 03-04-99

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- ~~1.~~ NDN 172-0022-0570-0: FUEL INJECTION DIAGNOSTIC CONTROL DEVICE
PUBLICATION NUMBER- 09910751 WO
- ~~2.~~ NDN 172-0022-0469-0: FUEL INJECTION VALVE PUBLICATION NUMBER
09910650 WO
3. NDN 172-0022-0468-9: FUEL INJECTION VALVE PUBLICATION NUMBER
09910649 WO
4. NDN 172-0022-0467-7: FUEL INJECTION VALVE PUBLICATION NUMBER
09910648 WO
- ~~5.~~ NDN 172-0022-0462-8: CONVERSION SYSTEM WITH ELECTRONIC CONTROL
LER FOR UTILIZATION OF GASEOUS FUELS IN SPARK IGNI
TION ENGINES PUBLICATION NUMBER- 09910643 WO

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 INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWE

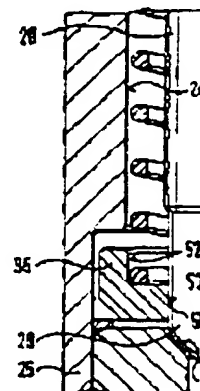
(51) Internationale Patentklassifikation 6 : <p style="text-align: center;">F02M 61/16, 61/12, 51/06</p>	A1	(11) Internationale Veröffentlichungsnummer: (43) Internationales Veröffentlichungsdatum:
(21) Internationales Aktenzeichen: PCT/DE98/02135 (22) Internationales Anmeldedatum: 28. Juli 1998 (28.07.98) (30) Prioritätsdaten: <div style="display: flex; justify-content: space-between;"> 197 36 632.1 22. August 1997 (22.08.97) DE </div> (71) Anmelder (für alle Bestimmungsstaaten ausser US): ROBERT BOSCH GMBH [DE/DE]; Postfach 30 02 20, D-70442 Stuttgart (DE). (72) Erfinder; und (75) Erfinder/Anmelder (nur für US): MÜLLER, Martin [DE/DE]; Friedrichstrasse 24, D-71696 Möglingen (DE); HEROLD, Stefan [DE/DE]; Don-Bosco-Strasse 15, D-96047 Bamberg (DE); RIEFENSTAHL, Jochen [DE/DE]; Am Hofbühl 6, D-96123 Litzendorf (DE); BRÜCKNER, Reinhold [DE/DE]; Mühlwiesen 7, D-96123 Litzendorf (DE); FISCHBACH, Dirk [DE/DE]; Bruderwaldstrasse 8, D-96049 Bamberg (DE); EICHENDORF, Andreas [DE/DE]; Paulinenstrasse 11/1, D-73614 Schorndorf (DE); HÜHNER, Martin [DE/DE]; Stresemannstrasse 33, D-71522 Backnang (DE); NORGAUER, Rainer [DE/DE]; Lichtenbergstrasse 11, D-71642 Ludwigsburg (DE); VIRNEKAS, Jürgen [DE/DE]; Breithrunner Strasse 5, D-96151 Breitbrunn (DE); SCHRAMM, Peter [DE/DE];	Ilbincstrasse 14, D-97478 Kallersbach [DE/DE]; Kirchplatz (DE); PREUSSNER, Christian D-71706 Markgröningen (DE); Nürnberger Strasse 27, D-96050 Oliver [DE/DE]; Friedrich-Eb Kuhnrich (DE); MARTIN, Otm 13, D-71735 Hochdorf (DE); [DE/DE]; In der Au 9, D-91330 (81) Bestimmungsstaaten: CN, CZ, J Patent (AT, BE, CH, CY, DE, DK, EE, FI, FR, GB, GR, HU, IL, IT, LU, MC, NL, PT, SE). Veröffentlicht <i>Mit internationalem Recherchen Vor Ablauf der für Änderungen a Frist; Veröffentlichung wird wir einreichen.</i>	

(54) Title: **FUEL INJECTION VALVE**

(54) Bezeichnung: **BRENNSTOFFEINSPRITZVENTIL**

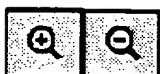
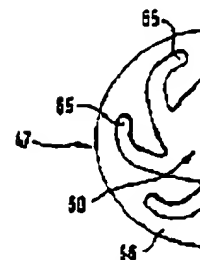
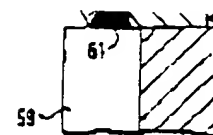
(57) Abstract

The invention relates to a fuel injection valve, especially a high pressure injection valve, which directly injects fuel into the combustion chamber of a mixture-compressing, spark-ignited internal combustion engine. The invention is characterized in that a guide and seat area is provided on the downstream end of the valve, said area being formed by three disc-shaped elements (35, 47, 26). A swirl element (47) is embedded between the guide element (35) and a valve seat element (26). The guide element (35) can move radially in the assembled valve and has an inner guide orifice (55), which guides an axially movable valve needle (20) traversing said orifice, whereas a valve closing area (28) of the valve needle (20) interacts with a valve seat surface (27) of the valve seat element (26). The swirl element (47) has an inner orifice area with several swirl channels that are not connected to the outer periphery of the swirl element (47). The entire orifice area extends completely along the thickness of the swirl element (47) in an axial direction.



(57) Zusammenfassung

Die Erfindung betrifft ein Brennstoffeinspritzventil, insbesondere ein Hochdruckeinspritzventil zum direkten Einspritzen von Brennstoff in einen Brennraum einer gemischverdichtenden fremdgezündeten Brennkraftmaschine, das sich dadurch auszeichnet, daß am stromabwärtigen Ende des Ventils ein Führungs- und Sitzbereich vorgesehen ist, der von drei scheibenförmigen Elementen (35, 47, 26) gebildet wird. Dabei ist ein Drallelement (47) zwischen einem Führungselement (35) und einem Ventilsitzelement (26) eingebettet. Das Führungselement (35) dient der Führung einer es durchragenden, axial beweglichen Ventilnadel (20), während ein Ventilschließabschnitt (28) der Ventilnadel (20) mit einer Ventilsitzfläche (27) des Ventilsitzelements (26) zusammenwirkt. Das Drallelement (47) weist einen inneren Öffnungsbereich mit mehreren Drallkanälen auf, die nicht mit dem äußeren Umfang des Drallelements (47) in Verbindung stehen. Der gesamte Öffnungsbereich erstreckt sich vollständig über die axiale Dicke des Drallelements (47).

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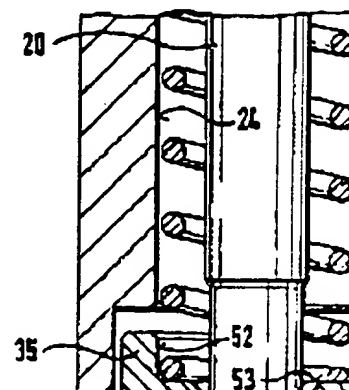
(51) Internationale Patentklassifikation 6: F02M 61/12, 61/16, 51/06		A1	(11) Internationale Veröffentlichungsnummer: (43) Internationales Veröffentlichungsdatum:
(21) Internationales Aktenzeichen: PCT/DE98/01758			Knetzgau (DE). WEIDLER, H 13a, D-96175 Pettstadt (DE). [DE/DE]; Bergergasse 8. (DE). KEIL, Thomas [DE/DE] D-96050 Bamberg (DE). K.F. Friedrich-Ebert-Strasse 13, D MARTIN, Ottmar [DE/DE]; Im Hochdorf/Eberdingen (DE). I [DE/DE]; In der Au 9, D-91330
(22) Internationales Anmeldedatum: 26. Juni 1998 (26.06.98)			
(30) Prioritätsdaten: 197 36 684.8 22. August 1997 (22.08.97) DE			
(71) Anmelder (für alle Bestimmungsstaaten ausser US): ROBERT BOSCH GMBH [DE/DE]; Postfach 30 02 20, D-70442 Stuttgart (DE).			
(72) Erfinder; und			
(75) Erfinder/Anmelder (nur für US): MÜLLER, Martin [DE/DE]; Friedrichstrasse 24, D-71696 Möglingen (DE). HEROLD, Stefan [DE/DE]; Valentinstrasse 43, D-96103 Hallstadt (DE). RIEFENSTAHL, Jochen [DE/DE]; Am Hofbühl 6, D-96123 Litzendorf (DE). BRÜCKNER, Reinhold [DE/DE]; Mühlwiesen 7, D-96123 Litzendorf (DE). FIS- CHBACH, Dirk [DE/DE]; Bruderwaldstrasse 8, D-96049 Bamberg (DE). EICHENDORF, Andreas [DE/DE]; Pauli- nenstrasse 11/1, D-73614 Schorndorf (DE). BÜHNER, Martin [DE/DE]; Stressemannstrasse 33, D-71522 Backnang (DE). NORGÄUER, Rainer [DE/DE]; Lichtenbergstrasse 11, D-71642 Ludwigsburg (DE). VIRNEKÄS, Jürgen [DE/DE]; Breitbrunner Strasse 5, D-96151 Breitbrunn (DE). SCHRÄMM, Peter [DE/DE]; Ilbincstrasse 14, D-97478			(81) Bestimmungsstaaten: CN, CZ, F Patent (AT, BE, CH, CY, DK, IR, IT, LU, MC, NL, PT, SE).
			Veröffentlicht <i>Mit internationalem Rechercheamt</i>

(54) Title: **FUEL INJECTION VALVE**

(54) Bezeichnung: **BRENNSTOFFEINSPRITZVENTIL**

(57) Abstract

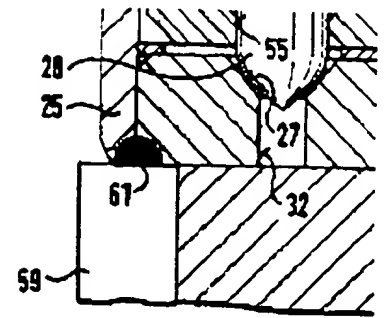
The invention relates to a fuel injection valve, especially a high pressure injection valve, which directly injects fuel into the combustion chamber of a mixture-compressing, spark-ignited internal combustion engine. The invention is characterized in that a guide and seal area is provided on the downstream end of the valve, said area being formed by three disc-shaped elements (35, 47, 26). A swirl element (47) is embedded between the guide element (35) and a valve seat element (26). The guide element (35) can move radially in the assembled valve and has an inner guide orifice (55), which guides an axially movable valve needle (20) traversing said orifice, whereas a valve closing area (28) of the valve needle (20) interacts with a valve seat surface (27) of the valve seat element (26). The guide element (35) is tensioned by a pressure spring (50) which engages in said element.



Wird eingesetzt in dem Element.

(57) Zusammenfassung

Die Erfindung betrifft ein Brennstoffeinspritzventil, insbesondere ein Hochdruckeinspritzventil zum direkten Einspritzen von Brennstoff in einen Brennraum einer gemischverdichtenden fremdgezündeten Brennkraftmaschine, das sich dadurch auszeichnet, daß am stromabwärtigen Ende des Ventils ein Führungs- und Sitzbereich vorgesehen ist, der von drei scheibenförmigen Elementen (35, 47, 26) gebildet wird. Dabei ist ein Drallelement (47) zwischen einem Führungselement (35) und einem Ventilsitzelement (26) eingebettet. Das im zusammengebauten Ventil radial bewegliche Führungselement (35) mit einer inneren Führungsöffnung (55) dient der Führung einer sie durchdragenden, axial beweglichen Ventilschließabschnitt (28) der Ventilmadel (20) mit einer Ventilsitzfläche (27) des Ventilsitzelements (26). Das Führungselement (35) ist durch eine an ihm angreifende Druckfeder (50) federverspannt.



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1. FUEL INJECTION DIAGNOSTIC CONTROL DEVICE - PCT 03-04-99 0991075
1 WO
NDN- 172-0022-0570-0

INVENTOR(S)- HOWARTH, Mark, Vincent 91 Bolton Road West, Ramsbottom,
Bury, Lancs. BL0 9NU United Kingdom
INVENTOR(S)- ZYLER, Edward, Christopher 26 Schofield Road, Peel
Green, Eccles, Manchester M30 7LG United Kingdom

APPLICANT(S)- FACTOR 1 LIMITED 91 Bolton Road West, Ramsbottom,
Bury, Lancs. BL0 9NU United Kingdom
APPLICANT(S)- HOWARTH, Mark, Vincent 91 Bolton Road West,
Ramsbottom, Bury, Lancs. BL0 9NU United Kingdom
APPLICANT(S)- ZYLER, Edward, Christopher 26 Schofield Road, Peel
Green, Eccles, Manchester M30 7LG United Kingdom DATE FILED-
1998-08-24 PUBLICATION NUMBER- 09910751 WO DOCUMENT TYPE- A1
PUBLICATION DATE- 1999-03-04 PATENT PRIORITY INFO- 9717993.1,
1997-08-27, United Kingdom ATTORNEY, AGENT, OR FIRM- AJELLO, Michael,
John, Urquhart-Dykes & Lord, Northern Assurance Buildings, Albert
Square,
Manchester M2 4DN, United Kingdom INTERNATIONAL PATENT CLASS- G0
1R;
31/00; F02M; 65/00; G01M; 15/00; F02D; 41/22 PCT APP. NO.-
PCT/GB98/02471 FILING LANGUAGE- English LANGUAGE- English

A diagnostic/control device for fuel injected internal combustion engines
comprising a control system connectable via leads to the fuel injectors
after disconnection therefrom of an engine management computer, the
latter
being connected directly (at 18) to the control system. An oxygen sensor
is connected (at 17) to the control system whereby the latter is connected
between the engine management computer and the fuel injectors and can be
operated in closed circuit or open circuit mode to control the injectors
directly when required independently of the engine management computer.

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2. FUEL INJECTION VALVE - PCT 03-04-99 09910650 WO NDN-
172-0022-0469-0

INVENTOR(S)- REITER, Ferdinand Burgweg 1, D-71706 Markgroningen
Germany

INVENTOR(S)- KRAUSE, Heinz-Martin Holderlinstrasse 1, D-71254
Ditzingen Germany

APPLICANT(S)- ROBERT BOSCH GMBH Postfach 30 02 20, D-70442 Stuttg
art Germany

APPLICANT(S)- REITER, Ferdinand Burgweg 1, D-71706 Markgroningen
Germany

APPLICANT(S)- KRAUSE, Heinz-Martin Holderlinstrasse 1, D-71254
Ditzingen Germany DATE FILED- 1998-06-17 PUBLICATION NUMBE

R- 09910650 WO DOCUMENT TYPE- A1 PUBLICATION DATE- 1999-03-04 PA
TENT

PRIORITY INFO- 197 36 548.5, 1997-08-22, Germany INTERNATIONAL
PATENT

E- CLASS- F02M; 69/04 PCT APP. NO.- PCT/DE98/01648 FILING LANGUAG
German LANGUAGE- German

The fuel injection valve is characterized in that a preparation att
achment
consisting of a gas-surrounding element and an insert is provided o
n the
downstream end of the fuel injection valve. The downstream end of t
he fuel
injection valve with the preparation attachment is totally encompass
sed by
a tubular, thin-walled, metal gas-surrounding body in the periphere
l
direction. The gas-surrounding body is fixed to one of the valve ho
usings
and encompasses at least partially the plastic tube of the fuel inj
ection
valve by means of a non-material fitting snap-on, clamp or clip con
nector.
The corresponding connector elements are configured in the form of
noses
and latches. The inventive fuel injection valve is particularly sui

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table

d for injecting an intake pipe of a mixture-compressing, spark-ignite
internal combustion engine.

3. FUEL INJECTION VALVE - PCT 03-04-99 09910649 WO NDN-

172-0022-0468-9

n INVENTOR(S) - MULLER, Martin Friedrichstrasse 24, D-71696 Moglinge

Germany

INVENTOR(S) - HEROLD, Stefan Don-Bosco-Strasse 15, D-96047 Bamberg

Germany

INVENTOR(S) - RIEFENSTAHL, Jochen Am Hofbuhl 6, D-96123 Litzendorf

Germany

INVENTOR(S) - BRUCKNER, Reinhold Muhlwiesen 7, D-96123 Litzendorf

Germany

INVENTOR(S)- FISCHBACH, Dirk Mail
Bruderwaldstrasse 8, D-96049 Bamberg

Germany

INVENTOR(S)- EICHENDORF, Andreas Paulinenstrasse 11/1, D-73614

Schorndorf Germany

INVENTOR(S)- BUHNER, Martin Stresemannstrasse 33, D-71522 Backnang

Germany

INVENTOR(S)- NORGAUER, Rainer Lichtenbergstrasse 11, D-71642

Ludwigsburg Germany

INVENTOR(S)- VIRNEKAS, Jurgen Breitbrunner Strasse 5, D-96151

Breitbrunn Germany

INVENTOR(S)- SCHRAMM, Peter Ilbincstrasse 14, D-97478 Knetzgau

Germany

INVENTOR(S)- WEIDLER, Hans Kirchplatz 13a, D-96175 Pettstadt

Germany

INVENTOR(S)- PREUSSNER, Christian Bergergassle 8, D-71706

Markgroningen Germany

INVENTOR(S)- KEIL, Thomas Nurnberger Strasse 27, D-96050 Bamberg

Germany

INVENTOR(S)- KIRSTEN, Oliver Friedrich-Ebert-Strasse 1g, D-95326

Kulmbach Germany

INVENTOR(S)- MARTIN, Ottmar Im Kaiserfeld 13, D-71735 Hochdorf

Germany

INVENTOR(S)- LEUSCHNER, Wolfgang In der Au 9, D-91330 Eggolsheim

Germany

art APPLICANT(S)- ROBERT BOSCH GMBH Postfach 30 02 20, D-70442 Stuttgart

Germany

en APPLICANT(S)- MULLER, Martin Friedrichstrasse 24, D-71696 Mogling

Germany

g APPLICANT(S)- HEROLD, Stefan Don-Bosco-Strasse 15, D-96047 Bamberg

Germany

f APPLICANT(S)- RIEFENSTAHL, Jochen Am Hofbuhl 6, D-96123 Litzendorf

Germany

Mail

APPLICANT(S) - BRUCKNER, Reinhold, Muhlwiesen 7, D-96123 Litzendorf
Germany

g APPLICANT(S) - FISCHBACH, Dirk Bruderwaldstrasse 8, D-96049 Bamberg
Germany

APPLICANT(S) - EICHENDORF, Andreas Paulinenstrasse 11/1, D-73614
Schorndorf Germany

ng APPLICANT(S) - BUHNER, Martin Stresemannstrasse 33, D-71522 Backnang
Germany

APPLICANT(S) - NORGAEUER, Rainer Lichtenbergstrasse 11, D-71642
Ludwigsburg Germany

APPLICANT(S) - VIRNEKAS, Jurgen Breitbrunner Strasse 5, D-96151
Breitbrunn Germany

APPLICANT(S) - SCHRAMM, Peter Ilbincstrasse 14, D-97478 Knetzgau
Germany

APPLICANT(S) - WEIDLER, Hans Kirchplatz 13a, D-96175 Pettstadt
Germany

APPLICANT(S) - PREUSSNER, Christian Bergergassle 8, D-71706
Markgroningen Germany

APPLICANT(S) - KEIL, Thomas Nurnberger Strasse 27, D-96050 Bamberg
Germany

APPLICANT(S) - KIRSTEN, Oliver Friedrich-Ebert-Strasse 1g, D-95326
Kulmbach Germany

APPLICANT(S) - MARTIN, Ottmar Im Kaiserfeld 13, D-71735 Hochdorf
Germany

APPLICANT(S) - LEUSCHNER, Wolfgang In der Au 9, D-91330 Eggolsheim
Germany

WO DATE FILED- 1998-07-28 PUBLICATION NUMBER- 09910649
DOCUMENT TYPE- A1 PUBLICATION DATE- 1999-03-04 PATENT PRIORITY

INFO- 197 36 682.1, (1997-08-22) Germany INTERNATIONAL PATENT CLASS- F
02M;

61/16; 61/12; 51/06 PCT APP. NO.- PCT/DE98/02135 FILING LANGUAGE-

The invention relates to a fuel injection valve, especially a high
pressure injection valve, which directly injects fuel into the combustion

chamber of a mixture-compressing, spark-ignited internal combustion
engine. The invention is characterized in that a guide and seat are
a is

provided on the downstream end of the valve, said area being formed
by three disc-shaped elements (35, 47, 26). A swirl element is embedded

d between the guide element and a valve seat element. The guide element
can

move radially in the assembled valve and has an inner guide orifice

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, which
guides an axially movable valve needle traversing said orifice, where as a
valve closing area of the valve needle interacts with a valve seat
surface
of the valve seat element. The swirl element has an inner orifice area
with several swirl channels that are not connected to the outer periphery
of the swirl element. The entire orifice area extends completely along the
thickness of the swirl element in an axial direction.

4. FUEL INJECTION VALVE - PCT 03-04-99 09910648 WO NDN-

172-0022-0467-7

INVENTOR(S) - MULLER, Martin Friedrichstrasse 24, D-71696 Moglingen

Germany

INVENTOR(S) - HEROLD, Stefan Valentinstrasse 43, D-96103 Hallstadt

Germany

INVENTOR(S) - RIEFENSTAHL, Jochen Am Hofbühl 6, D-96123 Litzendorf

Germany

Mail
INVENTOR(S)- BRUCKNER, Reinhold Muhlwiesen 7, D-96123 Litzendorf

Germany

INVENTOR(S)- FISCHBACH, Dirk Bruderwaldstrasse 8, D-96049 Bamberg

Germany

INVENTOR(S)- EICHENDORF, Andreas Paulinenstrasse 11/1, D-73614

Schorndorf Germany

INVENTOR(S)- BUHNER, Martin Stresemannstrasse 33, D-71522 Backnang

Germany

INVENTOR(S)- NORGAUER, Rainer Lichtenbergstrasse 11, D-71642

Ludwigsburg Germany

INVENTOR(S)- VIRNEKAS, Jurgen Breitbrunner Strasse 5, D-96151

Breitbrunn Germany

INVENTOR(S)- SCHRAMM, Peter Ilbincstrasse 14, D-97478 Knetzgau

Germany

INVENTOR(S)- WEIDLER, Hans Kirchplatz 13a, D-96175 Pettstadt

Germany

INVENTOR(S)- PREUSSNER, Christian Bergergassle 8, D-71706

Markgroningen Germany

INVENTOR(S)- KEIL, Thomas Nurnberger Strasse 27, D-96050 Bamberg

Germany

INVENTOR(S)- KIRSTEN, Oliver Friedrich-Ebert-Strasse 1g, D-95326

Kulmbach Germany

INVENTOR(S)- MARTIN, Ottmar Im Kaiserfeld 13, D-71735

Hochdorf/Eberdingen Germany

INVENTOR(S)- LEUSCHNER, Wolfgang In der Au 9, D-91330 Eggolsheim

Germany

art APPLICANT(S)- ROBERT BOSCH GMBH Postfach 30 02 20, D-70442 Stuttgart

Germany

APPLICANT(S)- MULLER, Martin Friedrichstrasse 24, D-71696 Mogling

Mail

en

Germany

APPLICANT(S)- HEROLD, Stefan Valentinstrasse 43, D-96103 Hallstad

t

Germany

APPLICANT(S)- RIEFENSTAHL, Jochen Am Hofbuhl 6, D-96123 Litzendor

f

Germany

APPLICANT(S)- BRUCKNER, Reinhold Muhlwiesen 7, D-96123 Litzendorf

Germany

APPLICANT(S)- FISCHBACH, Dirk Bruderwaldstrasse 8, D-96049 Bamber

g

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Ludwigsburg Germany

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Breitbrunn Germany

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APPLICANT(S)- PREUSSNER, Christian Bergergassle 8, D-71706

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Germany

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Kulmbach Germany

APPLICANT(S)- MARTIN, Ottmar Im Kaiserfeld 13, D-71735

Hochdorf/Eberdingen Germany

APPLICANT(S)- LEUSCHNER, Wolfgang In der Au 9, D-91330 Eggolsheim

Germany

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WO

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197 36 684.8, 1997-08-22, Germany INTERNATIONAL PATENT CLASS- F

02M;

61/12; 61/16; 51/06 PCT APP. NO.- PCT/DE98/01758 FILING LANGU

AGE-

The invention relates to a fuel injection valve, especially a high pressure injection valve, which directly injects fuel into the combustion

chamber of a mixture-compressing, spark-ignited internal combustion engine. The invention is characterized in that a guide and seat are

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5. CONVERSION SYSTEM WITH ELECTRONIC CONTROLLER FOR UTILIZATION OF GASEOUS

FUELS IN SPARK IGNITION ENGINES - PCT 03-04-99 09910643 WO
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INVENTOR(S) - KLOPP, Gerhard, O. 310 Oakhill Place S.W., Calgary,
Alberta T2V 3X5 Canada

h APPLICANT(S) - ALTERNATIVE FUEL SYSTEMS INC. Suite 420, 1207 - 11th
Avenue S.W., Calgary, Alberta T3C 0M5 Canada DATE FILED- 1998-08-25

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ATTORNEY, AGENT, OR FIRM- WOOD, Max, R., Swabey Ogilvy Renault, Suite
1600, 1981 McGill College Avenue, Montreal, Quebec H3A 2Y3, Canada
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A conversion system for converting a spark ignition engine to operate on gaseous fuel is disclosed. The conversion system includes an electronic controller which operates on several novel principles to provide su

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performance/responsiveness and to reduce exhaust emissions. The controller

in accordance with the invention assumes complete control of spark ignition timing when gaseous fuel mode is enabled and generates independent spark ignition signals tailored to the gaseous fuel. The

controller also generates an independent pulse width modulated gaseous

fuel injection signal that controls a high performance electronic solenoid

injector valve to supply gaseous fuel to the engine. Variable injector

speed is used to compensate for the dynamic range of the engine. A novel

dual array block learn scheme is used to provide efficient fuel control in

engines equipped with closed-loop monitoring systems and exhaust gas

recirculation. A gasoline power boost mode is also provided to enable

extra power when maximum engine torque is commanded. The advantage is an

efficient fuelling system which provides all of the advantages of gaseous

fuels while preserving the power capabilities of liquid fuels, and minimizing exhaust emissions.

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